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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,652	05/22/2001	Eng-Chew Cheah	9818-050-999	1049

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EXAMINER

ZARNEKE, DAVID A

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 06/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/863,652

Applicant(s)

CHEAH, ENG-CHEW

Examiner

David A. Zarneke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 20-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 20-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group 1, claims 1-13, in Paper No. 7 is acknowledged.

Newly added claims 20-27 read upon the elected invention and will be examined concurrently with claims 1-13.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-7 and 20-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Tanaka et al., US Patent 6,265,762.

Tanaka teaches a lead frame structure comprising:

a semiconductor die (10) with a pad electrode (11) thereon;

a package lead (3);

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a bond wire (13) comprising one end attached to the package lead, the other end attached to the pad electrode, and an intermediate portion; and

a wiring support (15) positioned between the package lead and the pad electrode that is attached to the intermediate portion of the bond wire (Figure 11).

Regarding claims 2 and 21, Tanaka teaches a support jig (16), to which the wiring support (15) is attached (Figure 11).

With respect to claims 3, 7, 22 and 26, Tanaka teaches the wiring support and the support jig as being made of an insulating material (10, 36+).

As to claims 4 and 23, Tanaka teaches a supporting body (8) attached to the support jig, wherein the die is attached to the supporting body (Figure 11).

Regarding claims 5 and 24, Tanaka teaches the supporting body as being made of a metallic material having a high thermal conductivity for heat dissipation (5, 10+).

With respect to claims 6 and 25, Tanaka teaches using a sealing body (14) that encloses the die, a portion of the package lead, the bond wire, the wiring support, and the supporting body (Figure 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 8 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al., US Patent 6,265,762, as applied to claims 1 and 20 above.

Tanaka fails to teach the die as comprising a programmable logic device.

It would have been obvious to one ordinary skill in the art at the time of the invention to optimize the die of Tanaka to include a programmable logic device because programmable logic devices are obvious and well-known semiconductor die setups (MPEP 2144.05(b)).

Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lacap, US Patent 5,905,299, in view of Tanaka et al., US Patent 6,265,762.

Lacap teaches a quad flat pack (QFP) package comprising:

- an electrically insulative tape (608) [intermediate lead finger mounting substrate];

- a die (606) having bond pads attached to one side of the tape;

- a lead (602);

- a bond wire (612) having one end attached to the bond pad of the die, the other end attached to the lead, and an intermediate portion;

- a heat spreader (614) attached to the opposite side of the tape; and

- a plastic molding (604) that encapsulates the die, part of the lead, the bond wire and the heat spreader (Figure 6).

Lacap fails to teach the attachment of an intermediate lead finger to an intermediate lead finger mounting substrate, wherein the intermediate lead finger is

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positioned between the package lead and the bond pad and attached to an intermediate portion of the bond wire, and encapsulated by the mold compound.

Tanaka teaches leadframe structure comprising a wiring support (15) attached to a support jig (8) [intermediate lead finger mounting substrate], wherein the wiring support is positioned between the lead and the bond pad and the intermediate portion of the bond wire is attached to the wiring support (Figure 11).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the wiring support of Tanaka in the invention of Lacap because Tanaka teaches that the wiring support supports and maintains a loop in the bond wire and keeps the bond wires at a fixed height thus avoiding short-circuit among mutual wires (10, 31-46).

Regarding claims 10 and 11, Lacap teaches the tape as being made of an insulating material (6, 55+); also Tanaka teaches the wiring support as being made of an insulating material (10, 36+).

With respect to claim 12, it would have been obvious to one ordinary skill in the art at the time of the invention to optimize the die of Lacap and/or Tanaka to include a programmable logic device because programmable logic devices are obvious and well-known semiconductor die alternative setups (MPEP 2144.05(b)).

As to claim 13, Lacap teaches the die as being attached to a middle portion of the tape (Figure 6) and Tanaka teaches the wiring support as being attached to a peripheral portion of the support jig (Figure 11).

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Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gainey et al., US Patent 6,313,519 ; Sugiyama et al., US Patent 6,297,545 (figure 24(c)), Nose, US Patent 6,040,621 (figure 5(d)); Hong et al., US Patent 5,889,308; Gow, 3rd et al., US Patent 5,168,368 (figure 4); Aoki et al., US Patent 4,903,114 (figures 3&7); Long, US Patent 4,771,330 (figure 3D); Jung et al., US Patent Application Publication 2002/0024122 (figure 4); and Japanese patents 6-177312, 5-206363, 5-198728 and 5-335366 are all cited as teaching the use of an intermediate bond wire support structure that is positioned between a lead and a bond pad of a die.

Any inquiry concerning this communication from the examiner should be directed to David A. Zarneke at (703)-305-3926. The examiner can normally be reached on M-Th (7:30-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703)-305-9883. The fax phone numbers for the organization where this application is assigned are (703)-308-7722 for regular communications and (703)-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

David A. Zarneke
June 10, 2002

